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Locating optimal Lymphatic Vessels with Ultrasonography for LVA Operation

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Introduction: The supermicrosurgical lympho-venous anastomosis (LVA) operation is a curative lymphedema therapy in conjunction to the complex decongestive therapy (CDT). The concept of LVA is to bypass the congested lymphatic flow into a vein. The current standard to locate lymphatic vessels is to use indocyanine green lymphoangiography (ICG). However due to chronic fluid retention and fibrosis of tissue in lymphedema patients, vessels deeper than ~ one centimeter under the skin cannot be visualized. In order to locate optimal lymphatic vessels with diameter around 1mm and to avoid time-consuming exploration intraoperatively, lymphatic vessels were located preoperatively with ultrasonography ONLY.

Material and Methods: A total amount of 28 patients (7 male) with lymphedema and positive lymphoscintigraphy were preoperatively examined with ultrasonography. The mean BMI was 25kg/m2 (± 4.2). In this retrospective descriptive study, we PRE-operatively located and evaluated the lymphatic vessels with ultrasound in lower and upper extremities without the use of ICG lymphatic vessel marking. Ultrasonography findings were confirmed INTRA-operatively under microscope and ICG.

Results: On average, three lymphatic vessels (range 2-6) were located by ultrasound in each patient. About 90.2% of the ultrasound detected lymphatic vessels could be verified intraoperatively with microscope. And 83.7% were verified AFTER skin incision by ICG. BEFORE skin incision only 15.4% of ultrasound located lymphatic vessels could be visualized with ICG. The lymphatic vessels were found on average 9.4mm (±3.2) below the skin and had an average diameter of 1.2mm (±0.6).

Conclusion: Ultrasonography is an effective method to find optimal lymphatic vessels with good diameter especially in overweight patients.